[Church of the Invalides.]

HOTEL DES INVALIDES, PARIS.

The geographical position of France renders the organization of its military power one of the most important objects of its domestic policy. After a peace of thirty years, the budget of the minister of war swallows up nearly one-fourth of the national taxes, and the standing army withdraws above three hundred thousand men from productive industry; besides which there are nearly six million persons enrolled as liable to serve among the national guards. Before the stranger has been long in Paris, he will have discovered that the military spirit is one of the most striking characteristics of the French people. It predominates over every other form of life in the picturesque capital of France. The population may be said to rise to the sound of the *reveillé* as in a great camp, and the drums beat the evening "tattoo" in every part of the city. At night, as the solitary passenger proceeds to his home, he meets patrols of the municipal guard, or is perhaps challenged by sentinels on duty at the different posts. The numerous guard-houses correspond to the "stations" of the London police. A review of the national guards and garrison of Paris on the Boulevards exhibits on a magnificent scale the pomp and circumstance of military display. These gay and beautiful thoroughfares are admirably adapted for such a purpose. Battalion after battalion marches past accompanied by its band, and if the spectator is placed so as to command a view of the advancing host as they come in procession apparently interminable, their arms glittering in the rays of a sun of unclouded splendour, he will acknowledge that few spectacles can be finer. Added to the scene itself are the historical recollections which belong to the capital of France, and the brilliant military renown which the French arms have acquired. But these are chiefly the commercial classes, the shopkeepers and artisans of Paris, who are moving past him with so martial an appearance, and it is impossible not to feel that the military genius of the French is a great power in the world for good or evil, and that the course of European history cannot but be modified by its influence. The garrison of Paris is usually composed of about thirty thousand men, and sometimes even of forty thousand, who are lodged in thirty-five barracks in different parts of the capital. The Paris national guard consists of twelve legions of infantry, of four battalions each, and there is a legion of cavalry of several squadrons. The number of armed citizens is about fifty thousand. The municipal guards, though under the direction of the prefect of police, are a military force, and comprise about fifteen hundred infantry and cavalry, remarkable for their soldier-like appearance. Even the firemen, between six and seven hundred in number, wear a military uniform. Here then we have above eighty thousand soldiers and citizen-soldiers in a population less than one-half the population of London. If the organization of London resembled that of Paris, instead of a few hundreds of the Guards and between three and four thousand policemen, we should have a garrison of sixty thousand troops of the line distributed in seventy barracks situated in every part of the metropolis; and a hundred thousand merchants, shopkeepers, clerks, and respectable artisans who could be assembled on grand occasions in military uniform, and of whom a certain number would be always on duty, mounting guard along with the household troops, while drilling, marching, reviewing, and other exercises which are requisite in gaining precision in military duties, would be continually going on. Every one will see that the existence of such a system in London would be intolerable under any other circumstances short of some dire national calamity. The deductions from the time of the citizen and the interference with his pursuits, which are involved in the

organization of a national guard, are, we suppose, cheerfully submitted to in Paris; and the impossibility of fancying such a state of things in London indicates very fully the differences, both social and mental, which prevail in the two capitals. We lose, it is true, the splendour of military spectacles: at a "grand review" for the gratification of a great northern prince who recently visited this country, there were, as it was remarked, about as many troops assembled as daily mount guard at his palace; but these displays may be very cheerfully dispensed with when they can only exist in connection with the predominance of the sword, and the intrusion of the camp and its spirit, upon domestic life.

Our object at present, however, is to give some account of the Hôtel des Invalides, the military hospital of France. An old soldier re-enters society under disadvantages so great as almost to preclude him from filling his part with success. He has been so long accustomed to form a part of a machine that he is disqualified for independent action, and he loses himself for want of guidance. He makes a bad colonist, generally speaking, and too often a bad member of society. Retired Uncle Tobys are not sufficient in number to afford an asylum for the more numerous Corporal Trims who require a resting-place in old age, and both policy and humanity dictate the necessity of establishing public institutions for the reception of the old veterans. In the sixteenth century the old and disabled soldiers in France had no other resource but the charity of the monasteries of royal foundation. In 1596 Henry IV. converted a convent in one of the faubourgs of Paris into an hospital for military invalids, but the institution, which was removed to another situation by Louis XIII., remained on a small scale for nearly a century. The long wars of Louis XIV. rendered it necessary to make provision for a larger number of old soldiers, and in 1670 the foundation of the Invalides was laid, the king reserving to himself the honour of being its sole benefactor by prohibiting legacies being left for its support. The main building, including the first church, was completed in 1706. Chelsea Hospital was begun a few years later, in 1682, and was completed some years earlier. The second church or dome of the Invalides, a view of which is given in the cut, was also completed in 1706, and was intended for the celebration of military rejoicings and festivals. Additions have been made from time to time to the buildings, which now cover an area of sixteen acres. The Hôtel des Invalides is almost the only public building in Paris which has always been retained for its original uses. The first Revolution changed only its name, and the Hôtel became the Temple of Humanity, while under the Empire it was called the Temple of Mars; but at the Restoration the old name again came officially into use.

The Hôtel des Invalides is situated on the right bank of the Seine, on the south side of Paris. It is approached by an esplanade, which extends from the quay on the Seine, and measures 1440 feet by 780. The fountain in the centre of the esplanade was formerly ornamented with the bronze lion taken from St. Mark's at Venice, which was restored at the peace of 1815, and is now replaced by a statue of Lafayette. On the north front there is a wide terrace laid out as a garden and bounded by a fosse. On the south front of the dome church there is a small green esplanade, beyond which are avenues of trees branching in various directions. The front of the Hôtel is 612 feet in length, and presents three projecting masses. The central part is decorated with Ionic pilasters, which support an arch ornamented with military trophies, in which is a bas-relief of Louis XIV. on horseback. The windows of this front are formed of a cuirass surmounted by a helmet and surrounded by a mantle, a circular window being pierced in the middle of each cuirass. The architectural decorations throughout are of a military character wherever they could with propriety be made so. The gateway in the centre leads to the Cour Royale, which is 312 feet by 192. This quadrangle consists of four piles of buildings with central projections, and pavilions at the angles. There are besides other courts; but a minute detail of the plan and of the architectural designs would scarcely be intelligible if only briefly given. The first church, called l'Eglise ancienne, is 66 feet high, 210 feet long by 40 in its least and 72 feet in its greatest breadth, and consists of a single nave, with low side aisles supporting a gallery. The flags taken by the French from the enemy are deposited in this church. They are chiefly Spanish and Fortuguese, with some from Algiers, and there are two or three English standards. During the empire the nave of this church was hung with nearly three thousand flags of every nation on the continent. They were destroyed the evening before the allied troops entered Paris in 1814. The second or dome church is a square edifice, 138 feet long, at the southern extremity of the first church. It is united to the old church by the arch in which the great altar stands. In the centre of each front is a projecting mass crowned by a pediment. The principal entrance is by the portico on the south side, which is composed of two ranks of columns, the lower ones of the Doric and the upper ones of the Corinthian order. The circular tower, which rises from the body of the church, is surmounted by forty columns of the Composite order, arranged in pairs. An attic, adorned with circular-headed windows, springs from the tower, and from this rises the dome, the curve of which is considered as peculiarly elegant. Its external diameter is 80 feet, which is within 32 feet of the diameter of St. Paul's. The spaces between the twelve ribs by which the dome is divided are decorated with projecting devices of military trophies, arms, &c., and, with the ribs themselves, are gilt. The dome is surmounted by a lantern, which is crowned by a spire, globe, and cross, all richly gilt. The total height from the ground to the summit of the cross is 323 feet. The pavement of the dome church is of white marble inlaid with lilies and ciphers, and the cordon of the order of the Holy Ghost. The ceiling is painted, and there are pictures in the different chapels. In a vault beneath the dome are interred the remains of Marshal Mortier and the other victims (one of whom was a young girl) of the attempt of Fieschi on the life of King Louis Philippe, on the 28th of July, 1835.

The government of this great establishment is under the immediate superintendence of the Minister of War. The governor is always a marshal of France, and he is assisted by about one hundred and twenty officers. His salary is 35,000 francs a year, or about 1400*l.* (25 francs to the pound). The general-commandant is paid 12,000 francs, the intendant 10,000 francs, and the colonel-major 6000 francs. All soldiers disabled by wounds, or who have served thirty years, are entitled to the privileges of the institution, which includes board, lodging, washing, and clothing. The Hôtel is capable of accommodating 7000 persons, but the number of inmates at present is only about 3000. The invalids receive a small sum for pocket-money, which for a private is 2 fr. a month, for a sergeant 4 fr., a captain 10 fr., a colonel 30 fr., and in like proportion for others of intermediate grade. Officers above the rank of captain are allowed to take their meals in their own apartments. In the officers' refectory the service consists of plate and porcelain. The Empress Maria Louisa presented a service of plate

to the Hôtel. The sub-officers and privates are divided into two parties to take their meals, one party breakfasting at nine and dining at four, and the other at ten and five. Soup is served besides in the morning. Their breakfast consists of soup, beef, and a dish of vegetables, and dinner of a ragout with vegetables, or eggs and vegetables. Officers are allowed a few extra dishes. The daily allowance of wine is a pint and three-quarters. and of bread one pound and a half, and these articles are of the same quality for all ranks. Each of the four grand refectories or dining-rooms (one for the officers and three for the privates) is one hundred and fifty feet by twenty-four, and in each there are thirty round tables, at which messes of twelve are formed. Above fifteen hundred pounds of meat are daily put into the coppers, and the same quantity is used for ragouts. The meat and vegetables are cooked by economical furnaces, each of which contains eight coppers. There are two coppers in each of which twelve hundred pounds of meat can be dressed; and in one of the kitchens there is a spit that will roast four hundred pounds of meat at once. There are two kitchens, one for the officers and one for the privates. The principal dormitories comprise eight spacious rooms, each of which contains from forty to fifty beds, and in the smaller sleeping-rooms the number of beds is from four to eight. Each man has his bed, straw mattress, wool mattress, and bolster, and a small cupboard for his clothes. There is a library of twenty thousand volumes for the use of the pensioners, which is open for six hours daily. The Council Chamber contains the portraits of the marshals of France, which are removed here on their death from the Salle des Maréchaux at the Tuileries.

MIND AMONG THE SPINDLES.

This is the title of a little work recently published as one of 'Knight's Weekly Volumes for all Readers,' being a selection of articles from an American work, called the 'Lowell Offering,' the production entirely of the young women, "the girls," as they style themselves, employed in the factories of that town. The real good sense, the absence of all affectation, and the fine moral tone evinced throughout, as well as the fact of such an undertaking being carried on through a period of now three years, cannot fail to render the volume interesting to all English readers, and we are induced therefore to give a very short specimen of the manner in which subjects are treated.

THE SPIRIT OF DISCONTENT.

"I will not stay in Lowell any longer; I am determined to give my notice this very day," said Ellen Collins, as the earliest bell was tolling to remind us of the hour for labour.

"Why, what is the matter, Ellen? It seems to me you have dreamed out a new idea! Where do you think of going? and what for?"

"I am going home, where I shall not be obliged to rise so early in the morning, nor be dragged about by the ringing of a bell, nor confined in a close noisy room from morning till night. I will not stay here; I am determined to go home in a fortnight."

Such was our brief morning's conversation.

In the evening, as I sat alone, reading, my companions having gone out to public lectures or social meetings, Ellen entered. I saw that she still wore the same gloomy expression of countenance which had been manifested in the morning; and I was disposed to remove from her mind the evil influence, by a plain common-sense conversation.

"And so, Ellen," said I, "you think it unpleasant to rise so early in the morning, and be confined in the noisy mill so many hours during the day. And I think so, too. All this, and much more, is very annoying, no doubt. But we must not forget that there are advantages, as well as disadvantages, in this employment, as in every other. If we expect to find all sunshine and flowers in any station in life, we shall most surely be disappointed. We are very busily engaged during the day: but then we have the evening to ourselves, with no one to dictate to or control us. I have frequently heard you say, that you would not be confined to household duties, and that you disliked the millinery business altogether, because you could not have your evenings for leisure. You know that in Lowell we have schools, lectures, and meetings, of every description, for moral and intellectual improvement."

"All this is very true," replied Ellen, "but if we were to attend every public institution, and every evening-school which offers itself for our improvement, we might spend every farthing of our earnings, and even more. Then if sickness should overtake us, what are the probable consequences? Here we are, far from kindred and home; and if we have an empty purse, we shall be destitute of *friends* also."

"I do not think so, Ellen. I believe there is no place where there are so many advantages within the reach of the labouring class of people as exist here; where there is so much equality, so few aristocratic distinctions, and such good fellowship, as may be found in this community. A person has only to be honest, industrious, and moral, to secure the respect of the virtuous and good, though he may not be worth a dollar; while, on the other hand, an immoral person, though he should possess wealth, is not respected."

"As to the morality of the place," returned Ellen, "I have no fault to find. I object to the constant hurry of everything. We cannot have time to eat, drink, or sleep; we have only thirty minutes, or at most three-quarters of an hour, allowed us, to go from our work, partake of our food, and return to the noisy clatter of machinery. Up before day, at the clang of the bell—and out of the mill by the clang of the bell—into the mill, and at work, in obedience to that ding-dong of a bell—just as though we were so many living machines. I will give my notice to-morrow: go, I will—I won't stay here and be a white slave."

"Ellen," said I, "do you remember what is said of the bee, that it gathers honey even in a poisonous flower? May we not, in like manner, if our hearts are rightly attuned, find many pleasures connected with our employment? Why is it, then, that you so obstinately look altogether on the dark side of a factory life? I think you thought differently while you were at home, on a visit, last summer—for you were glad to come back to the mill in less than four weeks. Tell me, now—why were you so glad to return to the ringing of the bell, the clatter of the machinery, the early rising, the half-hour dinner, and so on?"

I saw that my discontented friend was not in a humour to give me an answer—and I therefore went on with my talk.

"You are fully aware, Ellen, that a country life does not exclude people from labour—to say nothing of the inferior privileges of attending public worship—that people have often to go a distance to meeting of any kind—that books cannot be so easily obtained as they can here—that you cannot always have just such society as you wish—that you—"

She interrupted me, by saying, "We have no bell, with its everlasting ding-dong."

"What difference does it make?" said I, "whether you shall be awaked by a bell, or the noisy bustle of a farm-house? For, you know, farmers are generally up as early in the morning as we are obliged to rise."

"But then," said Ellen, "country people have none of the clattering of machinery constantly dinning in their ears."

"True," I replied, "but they have what is worse—and that is, a dull, lifeless silence all around them. The hens may cackle sometimes, and the geese gabble, and the pigs squeal"——

Ellen's hearty laugh interrupted my description—and presently we proceeded, very pleasantly, to compare a country life with a factory life in Lowell. Her scowl of discontent had departed, and she was prepared to consider the subject candidly. We agreed, that since we must work for a living, the mill, all things considered, is the most pleasant, and best calculated to promote our welfare; that we will work diligently during the hours of labour; improve our leisure to the best advantage, in the cultivation of the mind,—hoping thereby not only to increase our own pleasure, but also to add to the happiness of those around us. ALMIRA.

[Cumean Sibyl, Sistine Chapel.]

ESSAYS ON THE LIVES OF REMARKABLE PAINTERS.—No. XXVII.

MICHAEL ANGELO.—*Continued.*

HITHERTO we have seen Michael Angelo wholly devoted to the study and practice of sculpture: but soon after his return to Florence, he was called upon to compete with Lionardo da Vinci in executing the cartoons for the frescos with which it was intended to decorate the walls of the Palazzo Vecchio, or town-hall of Florence. The cartoon of Lionardo has been already described: that of Michael Angelo represented an incident which occurred during the siege of Pisa—a group of Florentine soldiers bathing in the Arno hear the trumpet which proclaims a sortie of the enemy, and spring at once to the combat—he chose this subject, perhaps, as affording ample opportunity to exhibit his peculiar and wonderful skill in designing the human figure. All is life and movement. The warriors, some already clothed, but the greater part undressed, hasten to obey the call to battle; they are seen clambering up the banks,—buckling on their armour,—rushing forward, hurriedly, eagerly. There are, altogether, about thirty figures, the size of life, drawn with black chalk, and relieved with white. This cartoon was regarded by his contemporaries as the most perfect of his works; that is, in respect to the execution merely: as to subject, sentiment, and character, it would not certainly rank with the finest of his works; for, with every possible variety of gesture and attitude, exhibited with admirable and life-like energy, and the most consummate knowledge of form, there was only one expression throughout, and that the least intellectual, majestic, or interesting—the expression of hurry and surprise. While this great work existed, it was a study for all the young artists of Italy: but Michael Angelo, who had suffered in person from the jealousy of one rival, was destined to suffer yet more cruelly from the envy of another. It is said that Bandinelli, the sculptor, profited by the troubles of Florence to tear in pieces this monument of the glory and genius of a man he detested; but in doing so he has only left an enduring stain upon his own fame. A small old copy of the principal part of the composition exists in the collection of the Earl of Leicester, at Holkham, and has been finely engraved.

The next work in which Michael Angelo was engaged was the tomb of Pope Julius II., who, while living, had conceived the idea of erecting a most splendid monument to perpetuate his memory. For this work, which was never completed, Michael Angelo executed the famous statue of Moses, seated, grasping his flowing beard with one hand, and with the other sustaining the tables of the law. While employed on this tomb, the pope commanded him to undertake also the decoration of the ceiling of the Sistine chapel. The reader may remember that Pope Sixtus IV., in the year 1473, erected his famous chapel, and summoned the best painters of that time, Signorelli, Cosimo Roselli, Perugino, and Ghirlandajo, to decorate the interior; but down to the year 1508 the ceiling remained without any ornament; and Michael Angelo was called upon to cover this enormous vault, a space of 150 feet in length by 50 in breadth, with a series of subjects, representing the most important events connected, either literally or typically, with the fall and redemption of mankind.

No part of Michael Angelo's long life is so interesting, so full of characteristic incident, as the history of his intercourse with Pope Julius II., which began in 1505, and ended only with the death of the pope in 1513.

Michael Angelo had at all times a lofty idea of his own dignity as an artist, and never would stoop either to flatter a patron, or to conciliate a rival. Julius II., though now seventy-four, was as impatient of contradiction, as fiery in temper, as full of magnificent and ambitious projects as if he had been in the prime of life; in his service was the famous architect Bramante, who beheld with jealousy and alarm the increasing fame of Michael Angelo, and his influence with the pontiff; and set himself by indirect means to lessen both. He insinuated to Julius that it was ominous to erect his own mausoleum during his lifetime, and the pope gradually fell off in his attentions to Michael Angelo, and neglected to supply him with the necessary funds for carrying on the work. On one occasion Michael Angelo, finding it difficult to obtain access to the pope, sent a message to him to this effect, "that henceforth, if his holiness desired to see him, he should send to seek him elsewhere:" and the same night, leaving orders with his servants to dispose of his property, he departed for Florence. The pope dispatched five couriers after him with threats, persuasions, promises—but in vain. He wrote to the Gonfaloniere Soderini, then at the head of the government of Florence, commanding him, on pain of his extreme displeasure, to send Michael Angelo back to him; but the inflexible artist absolutely refused: three months were spent in vain negociations. Soderini at length, fearing the pope's anger, prevailed on Michael Angelo to return, and sent with him his relation Cardinal Soderini, to make up the quarrel between the high contending powers. The pope was then at Bologna, and at the moment when Michael Angelo arrived he was at supper; he desired him to be brought into his presence, and, on seeing him, exclaimed in a transport of fury, "Instead of obeying our commands and coming to us, thou hast waited till we came in search of thee!" (Bologna being much nearer to Florence than to Rome.) Michael Angelo fell on his knees, and entreated pardon with a loud voice. "Holy father," said he, "my offence has not arisen from an evil nature; I could no longer endure the insults offered to me in the palace of your holiness!" He continued kneeling, and the pope continued to bend his brows in silence; when a certain bishop, who represented the Cardinal Soderini, thinking to mend the matter, interfered with excuses, representing that "Michael Angelo —poor man!—had erred through ignorance; that artists were wont to presume too much on their genius," and so forth. But the irascible pope, interrupting him with a sharp blow across the shoulders with his staff, exclaimed, "It is thou that art ignorant and presuming, to insult him whom we feel ourselves bound to honour; take thyself out of our sight!" And as the terrified prelate stood transfixed with amazement, the pope's attendants forced him out of the room. Julius then, turning to Michael Angelo, gave him his forgiveness and his blessing, and commanded him never again to leave him, promising him on all occasions his favour and protection. This extraordinary scene took place in November, 1506.

The work on the tomb was not, however, immediately resumed. Michael Angelo was commanded to execute a colossal statue of the pope to be erected in front of the principal church of Bologna. He threw into the figure and attitude so much of the haughty and resolute character of the original, that Julius, on seeing the model, asked him, with a smile, whether he intended to represent him as blessing or as cursing? To which Michael Angelo prudently replied, that he intended to represent his holiness as admonishing the inhabitants of Bologna to obedience and submission. "And what," said the pope, well pleased, "wilt thou put in the other hand?" "A book, may it please your holiness." "A book, man!" exclaimed the pope, "put rather a sword, thou knowest I am no scholar." The fate of this statue, however we may lament it, was fitting and characteristic. A few years afterwards the populace of Bologna rebelled against the popedom, flung down the statue of Julius, and out of the fragments was constructed a cannon, which from its origin was styled "*La Giuliana.*"

[From the Sistine Chapel.]

[From the Vault of the Sistine Chapel.]

On his return to Rome, Michael Angelo wished to have resumed his work on the mausoleum; but the pope had resolved on the completion of the Sistine chapel: he commanded Michael Angelo to undertake the decorations of the vaulted ceiling; and the artist was obliged, though reluctantly, to obey. At this time the frescoes which Raphael and his pupils were painting in the chambers of the Vatican had excited the admiration of all Rome. Michael Angelo, who had never exercised himself in the mechanical part of the art of fresco, invited from Florence several painters of eminence, to execute his designs under

his own superintendence; but they could not reach the grandeur of his conceptions, which became enfeebled under their hands; and one morning, in a mood of impatience, he destroyed all that they had done, closed the doors of the chapel against them, and would not thenceforth admit them to his presence. He then shut himself up, and proceeded with incredible perseverance and energy to accomplish his task alone; he even prepared his own colours with his own hands. He began with the end towards the door; and in the two compartments first painted (though not first in the series), 'The Deluge,' and 'The Vineyard of Noah,' he made the figures too numerous and too small to produce their full effect from below, a fault which he corrected in those executed subsequently. When almost half the work was completed, the pope insisted on viewing what was done, and the astonishment and admiration it excited rendered him more and more eager to have the whole completed at once. The progress, however, was not rapid enough to suit the impatient temper of the pontiff. On one occasion he demanded of the artist *when* he meant to finish it; to which Michael Angelo replied calmly, "When I can." "When thou canst!" exclaimed the fiery old pope. "Thou hast a mind that I should have thee thrown from the scaffold!" At length, on the day of All Saints, 1512, the ceiling was uncovered to public view. Michael Angelo was employed on the painting only, without reckoning the time spent in preparing the cartoons, twenty-two months, and he received in payment 3000 crowns.

To describe this grand work in all its details would occupy many pages. It will give some idea of its immensity to say that it contains in all upwards of 200 figures, the greater part of colossal size; and that with regard to invention, grandeur, and expression, it has been a school for study, and a theme for wonder, during three successive ages. In the centre of the ceiling are four large compartments and five small ones. In the former are represented the Creation of the Sun and Moon: the Creation of Adam, perhaps the most majestic design that ever was conceived by the genius of man; the Fall and the Expulsion from Paradise; the Deluge. In the five small compartments are represented the Gathering of the Waters (Gen. i. 9); the Almighty separating Light from Darkness; the Creation of Eve; the Sacrifice of Noah, and Noah's Vineyard. Around these, in the curved part of the ceiling, are the prophets and the Sibyls who foretold the birth of Christ. These are among the most wonderful forms that modern art has called into life. They are all seated and employed in contemplating books or antique rolls of manuscript, with genii in attendance. These mighty beings sit before us, looking down with solemn meditative aspects, or upwards with inspired looks that see into futurity. All their forms are massive and sublime, all are full of varied and individual character.

Beneath these again are a series of groups representing the earthly genealogy of Christ, in which the figures have a repose, a contemplative grace, and tenderness, which place them among the most interesting of all the productions of Michael Angelo. These and the figure of Eve in the Fall show how intense was his feeling of beauty, though he frequently disdained to avail himself of it. In the four corners of the ceiling are representations of the miraculous deliverance of the people of Israel in allusion to the general Redemption of man by the Saviour: viz. Holophernes vanquished by Judith, David overcoming Goliath, the Brazen Serpent, and the punishment of Haman.

There is a small print in Kugler's Hand-book, which will give a general idea of the arrangement of this famous ceiling; but there is one on a large scale by Piroli, and a still larger one by Cunego, which if accessible will answer the purpose better. The collection of engravings after Michael Angelo in the British museum is very imperfect, but it contains some fine old prints from the Prophets which should be studied by those who wish to understand the true merit of this great master, of whom Sir Joshua Reynolds said that "to kiss the hem of his garment, to catch the slightest of his perfections, would be glory and distinction enough for an ambitious man!"

CASTS FROM ORGANIZED SUBSTANCES.

For the purposes of the anatomist and the botanist it is often desirable to procure either casts or impressions of objects whose form and surface it is wished to preserve. It may be that a malformation in any part of the body is to be made an object of study, or that the delicate veins in a leaf are to be made the means of investigating the character of a plant: in either case an impression from the object would sometimes answer the same purpose as the original, and hence have arisen many modes of taking such impressions. These methods differ in some respects from those whereby impressions are taken from manufactured articles, and merit a little notice.

Impressions from the leaves of plants are sometimes taken either by smoking them or by dabbing on them a ball covered with printers' ink, and then taking an impression on a piece of damp paper, whereby the minute diversities of surface are portrayed in black and white on the paper. An ingenious modification of this arrangement was devised by Mr. Gill, to enable a botanical tourist to take impressions from plants while out in the field. His apparatus consisted of a dabber, a book, and a cylindrical ruler such as is used in a counting-house. The dabber was simply a small cushion an inch or so in diameter, covered with smooth kid-leather, and adapted to be used in the same way as the large ink-balls employed in printing. The book might be of any convenient size, say an octavo volume an inch thick. It contained, between two of its leaves, a piece of vellum folded in the middle; and the two middle pages of this vellum had a thin coating of printing-ink or some analogous substance, which remained damp by virtue of the oil which it contained. Having chosen the leaves or specimens of a plant, he placed them upon the blackened vellum, and caused them to take up a sufficient quantity of the ink by gently pressing them, one side after the other, with the dabber. The quantity of ink taken up by this method was extremely minute, yet adequate to the purpose. Two impressions were then taken from the leaf at once. A sheet of paper was folded, the inked specimen put within the fold, and the paper placed within the leaves of the book. The book was then laid on a flat spot of ground, the ruler placed on it, and the experimenter, holding by a gate, a post, or a rail, stood on the ruler and worked it to and fro over the book with the whole weight of his body. By this pressure the ink impression was transferred from the leaf to the white paper, and thus produced two copies at once. Mr. Gill stated that in one year he procured by this method several hundred impressions from beautiful leaves and parts of plants. If conducted at home, where more apparatus may be employed, it is recommended that a flat hard board be placed upon the ruler, and the feet be placed on the board, by which a more powerful and equable pressure may be obtained. Of course, where any kind of press is at hand, a more efficient method will be practicable; but the object was to devise a method which should be easily practicable in the open fields.

Some years back Mr. Deeble communicated to the

Society of Arts a method of taking casts from the leaves of plants; and the Society voted a silver Iris medal to him for the communication. In his letter to the Society Mr. Deeble says:—"The object I proposed in making casts similar to the one now submitted, was to supply myself with fac-similes of the form and texture of those plants which, as an engraver, I might have to introduce in the foreground of landscapes. It is well known that those who have obtained eminence in landscape-engraving have devoted a large portion of time to actual study in the fields. I need not allude to the difficulties which deny this practice to a man engaged in a profession demanding his own almost unassisted exertions, especially in a metropolis; nor mention how the inaptness of season or situation will prevent the obtaining of such plants as may be immediately wanted. These circumstances suggested to me the advantage, and a trial proved the practicability, of procuring, at an easy expense either of labour or money, accurate casts of the most common and conspicuous plants."

The method followed by Mr. Deeble was as follows:—The leaf, as soon as convenient after being gathered, was laid on fine-grained moist sand, in a perfectly natural position, having that surface uppermost which was to form the cast, and being banked up by sand, in order that it might be perfectly supported. It was then, by means of a broad camel-hair brush, coated with a thin film of wax and Burgundy pitch, rendered fluid by heat. The leaf being next removed from the sand, and dipped in cold water, the wax soon hardened, and at the same time became sufficiently tough to allow the leaf to be stripped off without altering its form. This being done, the wax mould was placed in moist sand, and banked up as the leaf itself had been; and the mould was filled with liquid plaster of Paris, which was worked into the small depressions by a camel-hair pencil. As soon as the plaster had set, the wax was capable of being removed by a little dexterity; for the solidification of the plaster gave out sufficient warmth to soften the wax in a slight degree, and thus facilitate the removal. The plaster cast thus obtained presented a very perfect copy of the leaf, and might be used instead of it for all the purposes of the engraver.

Some of our eminent sculptors have adopted rather a tedious and complicated mode of obtaining casts of leaves or sprigs. The very finest river-silt is taken, ground up, and made as an envelope to the leaves and sprigs. The whole is dried and thoroughly baked, by which the vegetable substances are reduced to a kind of ash. A strong blast of air is then sent through certain apertures left in the mass, by which the fragments of the leaves and sprigs are blown out, thereby leaving cavities corresponding exactly with them. These cavities then serve as moulds, from which casts can be afterwards taken.

All such articles as fruit and large flowers may be copied in wax by a peculiar arrangement of the details. We will suppose that such fruit as an apple or a pear is to be imitated. One half of the fruit is buried in soft clay, leaving the other half uppermost and exposed. This upper half is moistened with oil, as also the edge of the clay, and liquid plaster is poured on to a considerable thickness. When this is concreted, the fruit is taken out of the clay, and reversed in position, having now the other half uppermost. This half is oiled, as well as the edge of the plaster, and new plaster is poured on till the whole fruit is completely enveloped. When this is dry, the plaster is capable of being removed in two halves, for the oil prevents the edges of the two halves from adhering; and these two, when the fruit is removed from between them, form a mould for future castings. The two parts of the mould being temporarily brought together, a little melted wax is poured through a hole made in the mould, and is shaken about until it coats every part of the interior of the mould. When the wax is dry, the mould is opened, and the wax taken from it in the exact form of the original fruit.

Portions of the skeleton of animals, or anatomical specimens generally, are copied by various means. The most customary method is by means of plaster of Paris. Three kinds of plaster are used: a medium fineness for the mould; the finest for the surface of the cast, poured first into the mould; and the coarsest for the main bulk of the cast, poured into the mould after the finest. In making the mould of plaster, the mode of proceeding depends greatly on the shape of the specimen to be copied; if, like a medallion, it have no 'undercut' surfaces, the mode of procedure is very simple, like that of making the plaster-mould from a medallion; but if the specimen be of a rounded or tortuous form, such as a bone, it would be impossible to make a mould in this way, for the bone would be so completely enveloped in plaster as not to be removed without breaking the plaster to pieces. The contour of the specimen is first examined, to see in how many pieces the mould must be made in order to be removed safely. The specimen is oiled, and then coated with liquid plaster, only in such parts as are to form the first piece or section of the mould. The plaster, while in the act of setting, is spread over with a knife, to make it lie smooth, and is cut neatly round the edges to form a junction with the other pieces. The edges of this partial mould are then oiled, and another portion of mould made in a similar manner. The number of pieces may be from two to a dozen, according to the complexity of the specimen; and each piece is formed singly, but the whole being left on the specimen until the mould is completed. It is then taken off piecemeal (for the oil prevents the pieces from adhering at the edges), and the specimen removed from within. These several pieces, when required to form a mould for casting, are bound together, and a hole is made at which the liquid plaster can be introduced; after which the removal of the mould piecemeal enables the cast to be liberated. If we look at the plaster-casts in the shops of the Italian image-makers, we shall see that many of the figures have seams or projecting lines on their surfaces; these arise from the joinings of the moulds in which they were cast, in the manner just noticed.

There are many occasions in which it would be desirable to have a mould in one piece, which could not be effected if made of plaster; whereas if some elastic substance were used for the mould, it would yield sufficiently to allow the cast to be removed easily. Mr. Douglas Fox, of Derby, in a communication to the Society of Arts (for which a silver medal was awarded), described a mode of employing glue for this purpose. He said, "Having been much employed in taking casts of anatomical preparation, I frequently met with specimens, principally of hard substances, that did not admit of the moulds hitherto employed being removed from them. This arose from any given specimen of such description having various portions of it with considerable overlays; that is, there were hollows or undercut parts from which no mould could be withdrawn without its being injured. Although in many instances soft clay or soft wax may be used to take impressions, still these in numberless instances cannot be removed from the body to be moulded without being injured in those parts which were pressed into the hollows."

To obviate these inconveniences, Mr. Fox used glue in the following manner:—The specimen to be moulded was oiled, secured about an inch above the surface of

a board, and then surrounded with a wall of clay about an inch distant all round, and rising to a greater height than the specimen. Into the cell thus formed, thick, strong, melted glue was poured, until the specimen was completely enveloped. The glue, when in a state sufficiently set to be handled, was cut into two or more pieces by a sharp knife, and the specimen removed from the inside. These pieces, when afterwards temporarily put together, formed a mould which had many advantages on account of its elasticity. In the mould thus made casts were formed of plaster of Paris, or sometimes of wax; for it was found that wax, if not heated too highly, will cool in the mould so quickly as to leave the glue unacted on. Mr. Fox sent, as specimens of this art, casts of a deer's horn and of a calculous concretion, very rough on the surface; and on the expression of a desire on the part of the Society to know whether the softer parts of anatomical preparation could be moulded in a similar way, Mr. Fox sent a cast of a specimen which could not have been moulded in any way but with an elastic mould, such as of glue.

Professor Schreibers, of Vienna, some years ago took casts in metal of the internal parts of the ear,—by which we are to understand, the cavities in a particular bone of the skull. The bone was first placed in a crucible, and covered with sand, leaving the opening into the ear uncovered. It was then heated red-hot, until all the volatile animal matter was destroyed. The whole was removed from the fire, and allowed to cool; and fusible metal was poured through a small funnel into the cavity of the bone, till full. The bone itself was next eaten away by exposing it to the action of dilute muriatic acid; and the metal was thus liberated in the exact form of the cavities themselves.

It seems not improbable that electro-metallurgy will come in aid of this art, as of many others. An organized specimen, whether of vegetable or animal structure, may be either coated with a permanent film of metal, or may have a metallic mould formed from it, according to the object in view. For instance, an apple or a pear may be thus treated. It is first brushed over with blacklead, and then a small pin is thrust in at the stalk; and to this pin is connected the wire belonging to the zinc end of a galvanic battery; and the fruit is immersed in the solution of sulphate of copper, in which a piece of copper is also placed. By the action of the apparatus, a film of copper becomes deposited on the fruit. Cucumbers, potatoes, carrots, and various other vegetables may be coated in a similar way. After the objects are coated, the pin is withdrawn, and a little hole is thus left through which the juices of the vegetable may evaporate, and thus promote the complete drying of the encased object. The copper film retains its form even after the vegetable object has almost shrivelled away. Leaves and delicate twigs may be coated with copper or other metal in a similar way. On this point Mr. Smee states, "The beauty of electro-coppered leaves, branches, and similar objects, is surprising. I have a case of these specimens placed on a black ground, which no one would take to be productions of art. In the same room with them are a couple of those cases in which Ward has taught us to grow in this smoky metropolis some of the most interesting botanical specimens. In these cases are contained varieties of fairy-formed *adiantums*, verdant *lycopodiums*, brilliant *orchideæ*, rigid *cacti*, and creeping *lygodiums*, all growing in their natural luxuriance. The electro-coppered leaves, however, are beautiful when placed by the side of the productions of this miniature paradise; and when I state that the numerous hairs covering the leaves of a *melostoma*, and even the delicate hairs of the *salvia*, are all perfectly covered, the botanist must at once admit that these specimens have rather the minuteness of nature than the imperfection of art."

So far the application is merely to give a metallic surface to the organized substance; but by carrying on the process until a thick deposit be obtained, instead of merely coating the object, a mould will be obtained, from which casts may be made either by electric agency or by the usual means; and such casts will present the minutest points of diversity on the surface of the object. Some specimens of this kind are now to be seen in the exhibition of the proposed modes of decoration for the new Houses of Parliament, in King-street, St. James's.

Education of Children.—In the education of children, love is first to be instilled, and out of love, obedience is to be educed. Then impulse and power should be given to the intellect, and the ends of a moral being be exhibited. For this object, this must be effected by works of imagination; that they carry the mind out of self, and show the possible of the good and the great in the human character. The height, whatever it may be, of the imaginative standard will do no harm; we are commanded to imitate one who is inimitable. We should address ourselves to those faculties in a child's mind which are first awakened by nature, and, consequently, first admit of cultivation; that is to say, the memory and the imagination. The comparing power, the judgment, is not at that age active, and ought not to be forcibly excited, as is too frequently and mistakenly done in the modern systems of education, which can only lead to selfish views, debtor and creditor principles of virtue, and an inflated sense of merit. In the imagination of man, exists the seeds of all moral and scientific improvement; chemistry was first alchemy, and out of astrology sprang astronomy. In the childhood of these sciences, the imagination opened a way and furnished materials on which the ratiocinative power in a maturer state operated with success. The imagination is a distinguished characteristic of man, as a progressive being; and I repeat that it ought to be carefully guided and strengthened as the indispensable means and instrument of continued melioration and refinement.—*S. T. Coleridge.*

Cornish Miners.—The fifth volume of the Transactions of the Royal Geological Society of Cornwall treats of mining operations. The Cornish miner, says the 'Athenæum' in its review of this work, is naturally brave and often reckless. He delights in overcoming difficulties—his patience and perseverance is of the most marked kind, and in many parts of the country, he has constructed works, which testify to his hardihood and determination. At Botallack Mine, which is worked for a considerable distance under the Atlantic Ocean, the miners were tempted to follow the ore upwards to the sea, but the openings made were small, and the rock being extremely hard, a covering of wood and some cement sufficed to exclude the water and protect the workmen from the consequences of their rashness. Mr. Henwood, the author, thus describes a visit made by him and one of the mine-captains to a mine in the same district with Botallack, and similarly situated:—"I was once, however, underground in Wheal Cock during a storm. At the extremity of the *level* seaward, some eighty or one hundred fathoms from the shore, little could be heard of its effects, except at intervals, when the reflux of some unusually large wave projected a pebble outward, bounding and rolling over the rocky bottom. But, when standing beneath the base of the cliff, and in that part of the mine where but nine feet of rock stood between us and the ocean, the heavy roll of the large boulders, the ceaseless grinding of the pebbles, the fierce thundering of the billows, with the crackling and boiling as they rebounded, placed a tempest, in its most appalling form, too vividly before me ever to be forgotten. More than once, doubting the protection of our rocky shield, we retreated in affright, and it was only after repeated trials that we had confidence to pursue our investigations. Almost all the mines in the parish of St. Just, near the Land's End, are similarly situated, and the positions of several of the steam-engines are highly picturesque: perched on the verge, and even on the ledge of a tremendous precipice, they seem at the mercy of every storm, and to the beholder from beneath, they almost appear suspended in the air, and tottering to their fall." In the Cornish mines are 30,000 persons employed, averaging 18,472 men, 5764 women, and 5764 children.